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10/727,961	12/04/2003	Gregory D. Durgin	465-012US	7394

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EXAMINER	
MANOHARAN, MUTHUSWAMY GANAPATHY	

ART UNIT	PAPER NUMBER
2617	

DATE MAILED: 12/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/727,961	DURGIN, GREGORY D.	
	Examiner	Art Unit	
	Muthuswamy G. Manoharan	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15,17-21,23 and 26-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15,17-21,23 and 26-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-15,17-21,23, and 27-29 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7,10-12,15,17-21, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Kurner et al. (hereinafter Kurner) (IEEE Journal on selected areas in communications, Vol. 20, no. 3, April 2002).

Regarding **claim 1,** Kurner teaches a method comprising: estimating the signal attenuation of a signal between a first location and a second location ("**path loss**", **path loss involves source and a reference point**, Page 501, col. 1, line 8) due to a building based directly on a raster footprint of said building (Figure 9); wherein said first location is within said building ("**indoor pixel**", Figure 9) and said second location is outside of said building ("**the indoor path loss is derived from the outdoor path loss of all surrounding pixels**", Page 501, col. 1, lines 11-12; Figure 9).

Regarding **claim 2,** Kurner teaches the method of claim 1, wherein said raster footprint of said building comprises a plurality of exterior rasters ("**outdoor pixel**", Figure 9) and a plurality of interior rasters (Page 2, col.1; "**indoor pixel**", Figure 9).

Regarding **claim 3,** Kurner teaches the method of claim 2, further comprising determining a depth of a raster within said raster footprint, wherein said depth of said raster is defined by a layer number, L; wherein rasters in said plurality of exterior rasters have a layer number, L=1 ("**outdoor pixel",** Figure 9); wherein rasters in said plurality of interior rasters have a layer number L = 2 to n, wherein n is a positive integer ("**indoor pixel**", Figure 9); and wherein signal attenuation at layer L= m, wherein $m \geq 2$, is based on the signal losses at layers L = 1 through m –1 (Page 501, col. 1; Figure 9).

Regarding **claim 4**, Kurner further teaches the method of claim 1, wherein estimating the signal attenuation of said signal further comprises accounting for an effect of building orientation with respect to said first location and said second location ("path loss calculated by the outdoor model at pixel", Page 501, col.2, lines 10-12; Page 499, col. 2, lines 12-23; **well known in the art**).

Regarding **claim 5**, Kurner teaches the method of claim 1, wherein said raster footprint of said building comprises a plurality of exterior rasters; and wherein estimating the signal attenuation of said signal to (i) a direction between said first location and said second location, and (ii) said plurality of exterior rasters ("path loss calculated by the outdoor model at pixel", Page 501, col.2, lines 10-12; Page 499, col. 2, lines 12-23).

Regarding **claim 6**, Kurner teaches the method of claim 1, wherein said raster footprint of said building comprises a plurality of interior rasters ("**indoor pixel**", Figure

9); and wherein estimating the signal attenuation of said signal to (i) a direction between said first location and said second location, and (ii) said plurality of exterior rasters ("path loss calculated by the outdoor model at pixel", Page 501, col.2, lines 10-12; Page 499, col. 2, lines 12-23).

Regarding **claim 7**, Kurner further teaches the method of claim 1, further comprising developing a map from the estimate of signal attenuation, wherein said map associates location within said building with an indicator of signal attenuation (Figure 16).

Regarding **claim 10,** Kurner further teaches the method of claim 1, wherein the method wherein said raster footprint of said building comprises a boundary, a plurality of exterior rasters, and a plurality of interior rasters ("**indoor pixel**", "**outdoor pixel**", Figure 9); and estimating the signal attenuation ("path loss calculated by the outdoor model at pixel", Page 501, col.2, lines 10-12) comprises estimating an angle of incidence between (i) a signal vector between said first location and said second location, and (ii) an estimate of a surface vector of a first raster where said signal vector intersects said boundary (Page 499, col. 2, lines 12-23). **These limitations are necessitated by the physical theory.**

Regarding **claim 11,** Kurner further teaches the method of claim 2, further comprising determining a depth of a raster within said raster footprint, wherein said depth of said raster is defined by a layer number, L; wherein rasters in said plurality of exterior rasters have a layer number, L=1 ("**outdoor pixel",** Figure 9); wherein rasters in said plurality of interior rasters have a layer number L = 2 to n, wherein n is a positive

integer ("**indoor pixel**", Figure 9); and wherein signal attenuation at layer L= m, wherein $m \geq 2$, is based on the signal losses at layers L = 1 through m –1 (Page 501, col. 1; Figure 9).

Claim 12 is rejected for the same reason as set forth in claims 4.

Regarding **claim 15** Kurner teaches a method comprising: estimating the signal attenuation of a signal between a first location and a second location due to a building based on a raster footprint of said building (Figure 9; Page 501, Col. 1); wherein said building and said second location is outside of said building ("**the indoor path loss is derived from the outdoor path loss of all surrounding pixels", path loss involves source and a reference point**, Page 501, col. 1, lines 8-9); wherein said raster footprint of said building comprises a boundary, a plurality of exterior rasters, and a plurality of interior rasters ("**indoor pixel", "outdoor pixel**", Figure 9), and wherein estimating the signal attenuation comprises ("path loss calculated by the outdoor model at pixel", Page 501, col.2, lines 10-12) estimating an angle of incidence between (i) a signal vector between said first location and said second location, and (ii) an estimate of a surface vector of a first raster where said signal vector intersects said boundary (Page 499, col. 2, lines 12-23).

Regarding **claim 17**, Kurner teaches the method of claim 15, wherein said surface vector is estimated using at least one raster at said exterior of said raster footprint that is adjacent to said raster at said boundary (these limitations are inherent form Figure 9 and equations 7 and 13; The combination of equation 13 and Figure 9

teaches that path loss at outdoor pixel needs to be calculated and equation 7 teaches that the calculation of path loss further requires estimation of surface vector).

Regarding **claims 18-20**, examiner would like to take official notice that these limitations are well known in the art of mathematical physics (and also from previous Office action).

Claim 21 is rejected for the same reason as set forth in claim 15.

Regarding **claim 23,** Kurner teaches the method of claim 21, further comprising determining a depth of a raster within said raster footprint, wherein said depth of said raster is defined by a layer number, L; wherein rasters in said plurality of exterior rasters have a layer number, L=1 ("**outdoor pixel",** Figure 9); wherein rasters in said plurality of interior rasters have a layer number L = 2 to n, wherein n is a positive integer ("**indoor pixel**", Figure 9); and wherein signal attenuation at layer L= m, wherein $m \geq 2$, is based on the signal losses at layers L = 1 through m –1 (Page 501, col. 1; Figure 9).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 8,9,13,24, and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurner et al. (hereinafter Kurner) (IEEE Journal on selected

areas in communications, Vol. 20, no. 3, April 2002) in view of Bahl et al. (hereinafter Bahl) (US 6799047).

Regarding **claim 8,** Kurner teaches all the particulars of the claim except method of claim 7 further comprising using the signal-attenuation information from said map to adjust signal-strength estimates that are obtained from an outdoor radio frequency database. However, Bahl teaches the method of claim 7 further comprising using the signal-attenuation information from said map to adjust signal-strength estimates that are obtained from an outdoor radio frequency database (Col. 10, lines 25-40). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use the method of claim 7 further comprising using the signal-attenuation information from said map to adjust signal-strength estimates that are obtained from an outdoor radio frequency database to improve the outdoor based model to include effects of electromagnetic interactions due to buildings.

Regarding **claim 9**, Kurner teaches all the particulars of the claim except, the method of claim 8 further comprising: receiving a first signal-strength measurement for a first signal at said wireless terminal; and estimating the location of said wireless terminal by pattern matching a function of said first signal-strength measurement against the adjusted signal-strength estimates. However, Bahl teaches the method of claim 8 further comprising: receiving a first signal-strength measurement for a first signal at said wireless terminal; and estimating the location of said wireless terminal by pattern matching a function of said first signal-strength measurement against the adjusted signal-strength estimates (Abstract, lines 5-10). Therefore, it would be obvious to one of

ordinary skill in the art at the time of invention to use the method of claim 8 further comprising: receiving a first signal-strength measurement for a first signal at said wireless terminal; and estimating the location of said wireless terminal by pattern matching a function of said first signal-strength measurement against the adjusted signal-strength estimates. This modification provides possible locations of an unknown wireless stations and therefore, can be applied to locate a mobile station in case of emergency.

Claims 13 and 14 are rejected for the same reason as set forth in claims 8-9 respectively.

Regarding **claim 27**, Kurner teaches a method for estimating a location of a wireless terminal (Figure 10), said method comprising: accessing an outdoor radio frequency database, wherein provides signal strength as a function of location; and modifying said signal strength, as provided by said outdoor radio frequency database, with signal-attenuation values from an indoor radio frequency database, wherein said indoor radio frequency database provides signal attenuation as a function of location within a structure as determined by a raster map of said structure, as function of location within a structure (Page 501, Col. 2, equations 11-14). Kurner did not teach specifically radio frequency database. However, Bahl teaches in an analogous art a radio frequency database ("a table would relate a known position of the mobile computer to the signal strength of the mobile computer", Abstract; "pre-computed table", Col. 2, lines 15-27; Also, this limitation is well known in the art as admitted by the applicant (Paragraphs [0008-0009])). Therefore, it would be obvious to one of ordinary

skill in the art at the time of invention to use a radio frequency database for storing signal strength data for various locations for location determination of mobile stations.

Regarding **claim 28,** Kurner teaches all the particulars of the claim except the method further comprising: estimating the location of said wireless terminal by pattern matching a function of said first signal-strength measurement against signal-strength data from radio frequency database. However, Bahl teaches in an analogous art, the method of estimating the location of said wireless terminal by pattern matching a function of said first signal-strength measurement against signal-strength database ("from this comparison the mobile device determines its location"; Col. 2, lines 15-27; Also, this limitation is well known in the art as admitted by the applicant, Paragraphs [0008-0009]). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use the method of estimating the location of said wireless terminal by pattern matching a function of said first signal-strength measurement against signal-strength data database.

Regarding **claim 29,** Kurner in view of AP teaches all the particulars of the claim 27 including radio frequency database except, wherein said signal-attenuation values from said indoor radio frequency are orientation independent. However, Bahl teaches the method wherein said signal-attenuation values from said indoor radio frequency database are orientation-independent (Col. 6, lines 26-30). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use the method wherein said signal-attenuation values from said indoor radio frequency database are orientation-independent. This modification helps to eliminate the other external factors

such as user's body that could create significant difference in the detected signal strength.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Muthuswamy G. Manoharan whose telephone number is 571-272-5515. The examiner can normally be reached on 7:30AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eng George can be reached on 571-272-7495. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

GEORGE ENG
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